

U.S. Patent Application Serial No. 10/803,083
Amendment filed June 9, 2005
Reply to OA dated March 25, 2005

REMARKS

Claims 1 - 7 are currently pending in this patent application, claim 1 being the *only* independent claim in this case.

Claims 1 and 5 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. The applicants respectfully submit that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated March 25, 2005.

At the outset, the applicants thank the Examiner for now indicating that claims 2 - 4 and 6 would be allowable if rewritten in the manner suggested in the third full paragraph on page 3 of the outstanding Action. However, for the reasons more fully discussed below, the applicants have *not* amended the claims, in the manner suggested by the Examiner, at this time, because to do so would unnecessarily limit or narrow the scope of the claims to which the applicants are entitled.

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Claims 1, 5 and 7 stand rejected under 35 USC 103 based on Arai (U.S. Patent No. 5,255,317) in view of Engel (U.S. Patent No. 4,646,319). The applicants respectfully request reconsideration of this rejection.

The Examiner's specific reliance on the primary reference of Arai is quite odd for the following reasons. It is clear that the applicants' claimed modem coupling circuit for a power line carrier is "connected to power lines for transmitting and receiving data," as set forth in the preamble of independent claim 1. It is also clear that the applicants' claimed modem coupling circuit includes a transformer 1 necessarily coupled to a transmitting circuit 2 and a receiving circuit 3.

More particularly, it is a basic structure in the applicants' transformer to include the following significant structural arrangement:

[c]onnectively interposed between the transmitting circuit 2 and the secondary winding for transmission N2 are the drive resistances R2a, R2b. The receiving circuit 3 is connected to the secondary winding for reception N3, together with the terminating resistances R3a, R3b.^{1/}

In other words, the secondary winding N2 is connected to the transmitting circuit 2, while the secondary winding N3 is connected to the transmitting circuit 3.

^{1/} See, lines 11 - 15, page 8 of the Applicant's specification.

In the Examiner's reliance on Arai (on page 2 of the outstanding Action), the Examiner suggests that Arai teaches "a secondary winding [11c]." However, such Arai-type winding 11c is used primarily in a transformer within a switch system for servicing both an Integrated Service Digital Network (ISDN) and a Plain Old Telephone Service (POTS), and does *not* fully meet the above-discussed structural arrangement required in respectively connecting the applicants' secondary windings to the transmitting circuit 2 and the receiving circuit 2.

Also, although claim 5 has the above-discussed claimed secondary windings, the Examiner discusses his reasons for rejecting claims 1 and 7 on pages 2 and 3 of the outstanding Action, but *not* for claim 5. Accordingly, the applicants have amended claim 1 by incorporating therein a portion of claim 5, and amending claim 5 in the manner submitted herewith.

The secondary reference of Engel is narrowly relied upon for merely teaching, according to the Examiner, "a communication network [figure 1] comprising a magnetic core having a gap,"^{2/} but clearly does *not* supplement the above-discussed deficiencies or drawbacks in the teachings of Arai in fully meeting the applicants' claimed invention, as now set forth in amended claim 1.

^{2/} Please see, the last sentence on page 2 of the outstanding Action.

Additionally, the cited references are merely concerned with a switching system in a subscriber line interface circuit for serving both ISDN and POTS (Arai) and the decoupling of primary and secondary windings with each being tuned to a carrier frequency (Engel), and are *not* concerned with a circuit with a transformer having a structural arrangement that satisfies *all* of the first through sixth requirements, as outlined in the paragraph bridging pages 2 and 3 of the applicants' specification.

With respect to impedance matching, the applicants further respectfully submit that unlike a communication line, load impedance of a power line is largely changed from a short-circuit condition to an open condition. In order to obtain a transformer capable of stable impedance matching even under such load conditions, current limiting resistances R1A and R1b serially connected to a coupling capacitor C1 become key elements. Although there are many examples of discloser in which current limiting resistances are connected in parallel to a coupling capacitor (see for example, Arai's (FIG. 1) reference numbers 12, 13a, 13b or Deisch's (U.S. Patent No. 3,781,483, FIG. 1) reference letters C1, RB1, RG1), *no* example is disclosed in which current limiting resistances are serially connected to a coupling capacitor. The purpose of such parallel connection circuitries is limiting DC component current only.

In the case of a power line modem, emphasis is on implementing impedance matching extensively within transmission band. Therefore, the current limiting resistances in the applicants' instant claimed invention are serially connected, and are *not* in parallel.

As to ground balance, in a power line modem, minimizing a leak and common mode noise at the transmitting end and the receiving end respectively is indispensable. Therefore, the possible greatest ground balance is required. In order to improve the ground balance, a single layered bifilar construction is adopted at the line side. Further, by employing sandwich construction in which a primary winding is sandwiched between secondary windings for transmission and reception, the ground balance is dramatically improved. Such a construction is *not* disclosed in the cited references.

With regard to a dynamic range exceeding 100dB, in a power line modem, a number of high level noise signals are superimposed on power lines. Signals in a power line modem at the receiving end become extremely low level ones. In order to enable distortion-free reception of the minute signals, a transformer having extremely high dynamic range is necessary. Therefore, at the receiving end, receiving signal voltage is raised tenfold so as to have bigger level than floor noise level of the device. In order to prevent the transformer being magnetic saturated with respect to high noise level, current limiting resistances are serially connected and a gap is provided to a core. Further, in order

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to enable low impedance drive in transmission, a secondary winding for transmission and a secondary winding for reception are separately constructed. Further, by providing the gap to the core, magnetic saturation caused by enormous noise current can be prevented. Although Engel and Deisch disclose constructions having a gap formed in a core, these constructions do *not* satisfy each condition mentioned above.

In summary, the cited references do *not* disclose a construction in which a primary winding of a single-layered serial bifilar winding is sandwiched between secondary windings for transmission and reception, and further do *not* disclose the current limiting resistances being further serially connected to the capacitor.

In view of the above, the teachings of Arai and Engel would still fall far short in fully meeting the applicants' claimed modem coupling circuit for a power line carrier, as now set forth in amended claim 1 (and claims 2 - 7 which depend therefrom). This is the case even if, *arguendo*, the teachings of Arai and Engel can be combined in the manner suggested by the Examiner. Thus, the claimed invention would *not* have been obvious to a person of ordinary skill in the art under 35 USC 103 based on Arai in view of Engel.

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Accordingly, the withdrawal of the outstanding obviousness rejection under 35 USC 103 based on Arai (U.S. Patent No. 5,255,317) in view of Engel (U.S. Patent No. 4,646,319) is in order, and is therefore respectfully solicited.

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

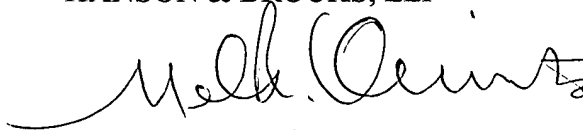
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper to Deposit Account No. 01-2340.

Respectfully submitted,

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